2. A composition comprising the polypeptide of claim 1 and a pharmaceutically acceptable carrier.

3. An isolated polypeptide comprising:

an amino acid sequence having pyrimidine glycosylase activity, the amino acid sequence having at least about 15 % identity with an amino acid sequence selected from the group consisting of SEQ ID NO:41, SEQ ID NO:42, and SEQ ID NO:43; and

an exogenous targeting sequence.

4. A composition comprising the polypeptide of claim 3 and a pharmaceutically acceptable carrier.

9. An isolated polypeptide comprising:

an amino acid sequence selected from the group consisting of SEQ ID NO:41, SEQ ID NO:42, and SEQ ID NO:43; and

a targeting sequence.

10. An isolated polypeptide comprising:

an amino acid sequence selected from the group consisting of SEQ ID NO:41, SEQ ID NO:42, and SEQ ID NO:43; and

an exogenous targeting sequence.

11. An isolated polypeptide comprising:

an amino acid sequence having pyrimidine glycosylase/AP lyase activity, the amino acid sequence having at least about 15 % identity with an amino acid sequence selected from the group consisting of SEQ ID NO:41, SEQ ID NO:42, and SEQ ID NO:43; and

a targeting sequence.

12. An isolated polypeptide comprising:

an amino acid sequence having pyrimidine glycosylase /AP lyase activity, the amino acid sequence having at least about 15 % identity with an amino acid sequence selected from the group consisting of SEQ ID NO:41, SEQ ID NO:42, and SEQ ID NO:43; and

an exogenous targeting sequence.

21. A method for increasing the repair rate of damaged bases in a cell, the method comprising introducing to a cell exposed to or at risk of exposure to an agent that damages DNA a composition comprising an amount of an isolated polypeptide effective to increase the repair rate of damaged DNA in the cell compared to a cell that does not comprise the polypeptide, wherein the polypeptide comprises an amino acid sequence having pyrimidine glycosylase activity, wherein the amino acid sequence has at least about 15 % identity with an amino acid sequence selected from the group consisting of SEQ ID NO:41, SEQ ID NO:42, and SEQ ID NO:43, and wherein the polypeptide further comprises a targeting sequence.

22. A method for increasing the repair rate of damaged bases in a cell, the method comprising introducing to a cell exposed to or at risk of exposure to an agent that damages DNA a composition comprising an amount of an isolated polypeptide effective to increase the repair rate of damaged DNA in the cell compared to a cell that does not comprise the polypeptide, wherein the polypeptide comprises an amino acid sequence having pyrimidine glycosylase activity, wherein the amino acid sequence has at least about 15 % identity with an amino acid sequence selected from the group consisting of SEQ ID NO:41, SEQ ID NO:42, and SEQ ID NO:43, and wherein the polypeptide further comprises an exogenous targeting sequence.

23. A method for increasing the repair rate of damaged bases in a cell, the method comprising introducing to a cell exposed to or at risk of exposure to an agent that damages DNA a composition comprising an amount of an isolated polypeptide effective to increase the repair rate of damaged DNA in the cell compared to a cell that does not comprise the polypeptide,

wherein the polypeptide comprises an amino acid sequence having pyrimidine glycosylase/AP lyase activity, wherein the amino acid sequence has at least about 15 % identity with an amino acid sequence selected from the group consisting of SEQ ID NO:41, SEQ ID NO:42, and SEQ ID NO:43, and wherein the polypeptide further comprises a targeting sequence.

24. A method for increasing the repair rate of damaged bases in a cell, the method comprising introducing to a cell exposed to or at risk of exposure to an agent that damages DNA a composition comprising an amount of an isolated polypeptide effective to increase the repair rate of damaged DNA in the cell compared to a cell that does not comprise the polypeptide, wherein the polypeptide comprises an amino acid sequence having pyrimidine glycosylase/AP lyase activity, wherein the amino acid sequence has at least about 15 % identity with an amino acid sequence selected from the group consisting of SEQ ID NO:41, SEQ ID NO:42, and SEQ ID NO:43, and wherein the polypeptide further comprises an exogenous targeting sequence.

25. A method for treating mutagenesis in a subject, the method comprising introducing to a subject exposed to or at risk of exposure to an agent that damages DNA a composition comprising an effective amount of an isolated polypeptide, wherein the polypeptide comprises an amino acid sequence having pyrimidine glycosylase activity, wherein the amino acid sequence has at least about 15 % identity with an amino acid sequence selected from the group consisting of SEQ ID NO:41, SEQ ID NO:42, and SEQ ID NO:43, and wherein the polypeptide further comprises an targeting sequence.

26. A method for treating mutagenesis in a subject, the method comprising introducing to a subject exposed to or at risk of exposure to an agent that damages DNA a composition comprising an effective amount of an isolated polypeptide, wherein the polypeptide comprises an amino acid sequence having pyrimidine glycosylase activity, wherein the amino acid sequence has at least about 15 % identity with an amino acid sequence selected from the

group consisting of SEQ ID NO:41, SEQ ID NO:42, and SEQ ID NO:43, and wherein the polypeptide further comprises an exogenous targeting sequence.

27. A method for treating mutagenesis in a subject, the method comprising introducing to a subject exposed to or at risk of exposure to an agent that damages DNA a composition comprising an effective amount of an isolated polypeptide, wherein the polypeptide comprises an amino acid sequence having pyrimidine glycosylase/AP lyase activity, wherein the amino acid sequence has at least about 15 % identity with an amino acid sequence selected from the group consisting of SEQ ID NO:41, SEQ ID NO:42, and SEQ ID NO:43, and wherein the polypeptide further comprises a targeting sequence.

28. A method for treating mutagenesis in a subject, the method comprising introducing to a subject exposed to or at risk of exposure to an agent that damages DNA a composition comprising an effective amount of an isolated polypeptide, wherein the polypeptide comprises an amino acid sequence having pyrimidine glycosylase/AP lyase activity, wherein the amino acid sequence has at least about 15 % identity with an amino acid sequence selected from the group consisting of SEQ ID NO:41, SEQ ID NO:42, and SEQ ID NO:43, and wherein the polypeptide further comprises an exogenous targeting sequence.

29. A method for treating immunosuppression in a subject, the method comprising introducing to a subject exposed to or at risk of exposure to an agent that damages DNA a composition comprising an effective amount of an isolated polypeptide, wherein the polypeptide comprises an amino acid sequence having pyrimidine glycosylase activity, wherein the amino acid sequence has at least about 15 % identity with an amino acid sequence selected from the group consisting of SEQ ID NO:41, SEQ ID NO:42, and SEQ ID NO:43, and wherein the polypeptide further comprises a targeting sequence.

30. A method for treating immunosuppression in a subject, the method comprising introducing to a subject exposed to or at risk of exposure to an agent that damages DNA a composition comprising an effective amount of an isolated polypeptide, wherein the polypeptide comprises an amino acid sequence having pyrimidine glycosylase activity, wherein the amino acid sequence has at least about 15 % identity with an amino acid sequence selected from the group consisting of SEQ ID NO:41, SEQ ID NO:42, and SEQ ID NO:43, and wherein the polypeptide further comprises an exogenous targeting sequence.

31. A method for treating immunosuppression in a subject, the method comprising introducing to a subject exposed to or at risk of exposure to an agent that damages DNA a composition comprising an effective amount of an isolated polypeptide, wherein the polypeptide comprises an amino acid sequence having pyrimidine glycosylase/AP lyase activity, wherein the amino acid sequence has at least about 15 % identity with an amino acid sequence selected from the group consisting of SEQ ID NO:41, SEQ ID NO:42, and SEQ ID NO:43, and wherein the polypeptide further comprises a targeting sequence.

32. A method for treating immunosuppression in a subject, the method comprising introducing to a subject exposed to or at risk of exposure to an agent that damages DNA a composition comprising an effective amount of an isolated polypeptide, wherein the polypeptide comprises an amino acid sequence having pyrimidine glycosylase/AP lyase activity, wherein the amino acid sequence has at least about 15 % identity with an amino acid sequence selected from the group consisting of SEQ ID NO:41, SEQ ID NO:42, and SEQ ID NO:43, and wherein the polypeptide further comprises an exogenous targeting sequence.

33. A method for treating tumor formation in a subject, the method comprising introducing to a subject exposed to or at risk of exposure to an agent that damages DNA a composition comprising an effective amount of an isolated polypeptide, wherein the polypeptide comprises an amino acid sequence having pyrimidine glycosylase activity, wherein the amino

acid sequence has at least about 15 % identity with an amino acid sequence selected from the group consisting of SEQ ID NO:41, SEQ ID NO:42, and SEQ ID NO:43, and wherein the polypeptide further comprises a targeting sequence.

34. A method for treating tumor formation in a subject, the method comprising introducing to a subject exposed to or at risk of exposure to an agent that damages DNA a composition comprising an effective amount of an isolated polypeptide, wherein the polypeptide comprises an amino acid sequence having pyrimidine glycosylase activity, wherein the amino acid sequence has at least about 15 % identity with an amino acid sequence selected from the group consisting of SEQ ID NO:41, SEQ ID NO:42, and SEQ ID NO:43, and wherein the polypeptide further comprises an exogenous targeting sequence.

35. A method for treating tumor formation in a subject, the method comprising introducing to a subject exposed to or at risk of exposure to an agent that damages DNA a composition comprising an effective amount of an isolated polypeptide, wherein the polypeptide comprises an amino acid sequence having pyrimidine glycosylase activity/AP lyase activity, wherein the amino acid sequence has at least about 15 % identity with an amino acid sequence selected from the group consisting of SEQ ID NO:41, SEQ ID NO:42, and SEQ ID NO:43, and wherein the polypeptide further comprises a targeting sequence.

36. A method for treating tumor formation in a subject, the method comprising introducing to a subject exposed to or at risk of exposure to an agent that damages DNA a composition comprising an effective amount of an isolated polypeptide, wherein the polypeptide comprises an amino acid sequence having pyrimidine glycosylase/AP lyase activity, wherein the amino acid sequence has at least about 15 % identity with an amino acid sequence selected from the group consisting of SEQ ID NO:41, SEQ ID NO:42, and SEQ ID NO:43, and wherein the polypeptide further comprises an exogenous targeting sequence.

37. A method for treating apoptotic cell formation in a subject, the method comprising introducing to a subject exposed to or at risk of exposure to an agent that damages DNA a composition comprising an effective amount of an isolated polypeptide, wherein the polypeptide comprises an amino acid sequence having pyrimidine glycosylase activity, wherein the amino acid sequence has at least about 15 % identity with an amino acid sequence selected from the group consisting of SEQ ID NO:41, SEQ ID NO:42, and SEQ ID NO:43, and wherein the polypeptide further comprises a targeting sequence.

38. A method for treating apoptotic cell formation in a subject, the method comprising introducing to a subject exposed to or at risk of exposure to an agent that damages DNA a composition comprising an effective amount of an isolated polypeptide, wherein the polypeptide comprises an amino acid sequence having pyrimidine glycosylase activity, wherein the amino acid sequence has at least about 15 % identity with an amino acid sequence selected from the group consisting of SEQ ID NO:41, SEQ ID NO:42, and SEQ ID NO:43, and wherein the polypeptide further comprises an exogenous targeting sequence.

39. A method for treating apoptotic cell formation in a subject, the method comprising introducing to a subject exposed to or at risk of exposure to an agent that damages DNA a composition comprising an effective amount of an isolated polypeptide, wherein the polypeptide comprises an amino acid sequence having pyrimidine glycosylase/AP lyase activity, wherein the amino acid sequence has at least about 15 % identity with an amino acid sequence selected from the group consisting of SEQ ID NO:41, SEQ ID NO:42, and SEQ ID NO:43, and wherein the polypeptide further comprises a targeting sequence.

40. A method for treating apoptotic cell formation in a subject, the method comprising introducing to a subject exposed to or at risk of exposure to an agent that damages DNA a composition comprising an effective amount of an isolated polypeptide, wherein the polypeptide comprises an amino acid sequence having pyrimidine glycosylase/AP lyase activity,

wherein the amino acid sequence has at least about 15 % identity with an amino acid sequence selected from the group consisting of SEQ ID NO:41, SEQ ID NO:42, and SEQ ID NO:43, and wherein the polypeptide further comprises an exogenous targeting sequence.

41. A composition comprising the polypeptide of claim 9 and a pharmaceutically acceptable carrier.

42. A composition comprising the polypeptide of claim 10 and a pharmaceutically acceptable carrier.

43. A composition comprising the polypeptide of claim 11 and a pharmaceutically acceptable carrier.

44. A composition comprising the polypeptide of claim 12 and a pharmaceutically acceptable carrier.